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The universal influence of contact resistance on TEG efficiency

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We present an investigation of the influence of both electrical and thermal contact resistance on the efficiency of a segmented thermoelectric generator [1]. For the study, 12 different segmented p -legs and 12 different segmented n -legs are considered, using 8 different p -type and 8 different n -type thermoelectric materials. For all systems, a universal influence of both the electrical and thermal contact resistance is observed on the leg's efficiency. The universal behaviour allows the maximum tolerable contact resistance for a segmented system to be found, i.e. the resistance at which a leg of only the high temperature thermoelectric material has equal efficiency as a segmented leg with contact resistance at the interface, as shown in Fig. 1.

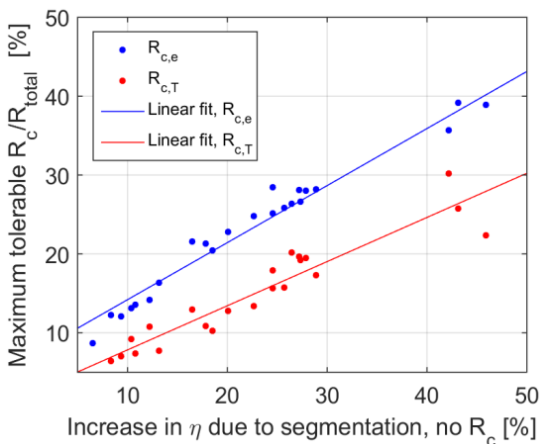


Figure 35: The maximum tolerable pure electrical or thermal contact resistance for a segmented TE leg as function of the gain in efficiency due to the segmentation.

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References:

[1] R. Bjørk, The universal influence of contact resistance on the efficiency of a thermoelectric generator, Accepted Journal of Electronic Materials (2015)